

How to Change the World

Towards Game Changer Networks for Green Innovation

Tommi Lampikoski, Kristian Möller

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TOWARDS GAME CHANGER NETWORKS FOR GREEN INNOVATION

Preface

This is a managerially oriented paper linked to an ongoing study on green innovations. The material has been collected primarily in the US and it focuses on innovation networks and entrepreneurs working at the edge of green business innovations. As the reporting of the project is very much in the process the authors invite any comments, suggestions and question, as well as criticisms from the readers.

INTRODUCTION

Several thought leaders are suggesting that sustainability, advancing regulations and increasingly embraced green values are the key drivers of innovation. Although there is a lot hype concerning the green innovation, there are, in late C.K. Prahalad's words, no alternative to sustainable developmentⁱ. Green innovation is tough, however, as it may span over industries and involves networking between various members of business ecosystems - regulators, NGOs, venture capitalists, large corporations, special high tech & science SMEs, entrepreneurs and thought leadersⁱⁱ.

Based on a two year study on green innovation we recognized that there are many various forms of innovations aiming at sustainable growth and profitability (see About Research, page 3.). These range from company specific waste management efforts to orchestrating new ecosystems like the emerging electric-car business and differ widely in their ambition and management challenges. Only specific green innovations possess the potential to disrupt or transform traditional industries via utilizing environmentally and economically viable business models. Our focus lies on answering what are these game changing green networks and how can managers initiate, motivate and orchestrate these?

Green business is not a new phenomenon. To provide a background for the current development we first discuss four phases of green business development progressing from firm-

specific to cross industrial. Focusing on radical and collaborative green innovation we present and discuss three cases that have the caliber of becoming game changers and disrupt traditional value-systems. Based on these results, we conclude by proving a playground framework for managing value creation of green innovations.

About research		
<p>The article's idea originated from research the lead author performed over a 2-year period while studying game changing networks. In phase one, we explored the types of networks for green innovation and identified leading green firms and networks. The lead author visited and conducted interviews with 33 firms and a total of 37 sustainability directors and start up founders in the US. Among the companies that contributed to the authors’ understanding of initiating, orchestrating and scaling game changing networks included e.g. Nike, IBM, Intel, Unilever, Starbucks and Interface. In phase two, the authors collected network initiation experience by interviewing the founders of start-up firms with people-planet-profit aspirations, such as GoodGuide. The key goal was to understand the entrepreneurial passion to create beyond profits purpose and understand how entrepreneurs initiate networks. The interviews and material cover large corporations, start-ups and individual thought leaders. See sample list of green business networks:</p>		
Industry level	Cross industrial	Potential game-changers
Energy Star	Natural Step	Grameen Bank & Foundation
LEED	US Climate Action Partnership	Green Tech Network
Marine Stewardship Council	Carbon Disclosure Project	Product RED
Nordic Swan label	1% Alliance	Bill and Melinda Gates Foundation
Sustainability Index Coalition	Natural Capitalism	Clinton Global Initiative

THE WAVES OF GREEN INNOVATION

One can make sense of the current variety of green innovations by depicting the emergence of four waves highlighted in Figure 1. The early consciousness of sustainable business and green innovation was emerging in 1970's. One landmark was the first Earth Day event with over 20 million participants across the US, encouraging organic farming and solar energy movements. Many now iconic “born sustainable”- firms such as Patagonia and Body Shop were founded. This early wave of green innovation was primarily firm-centered. Pioneering companies, like Dow Chemicals and 3M used cross-functional teams to advance the environmental agenda with key mission to eliminate energy, waste and water use, and to design green product offerings.

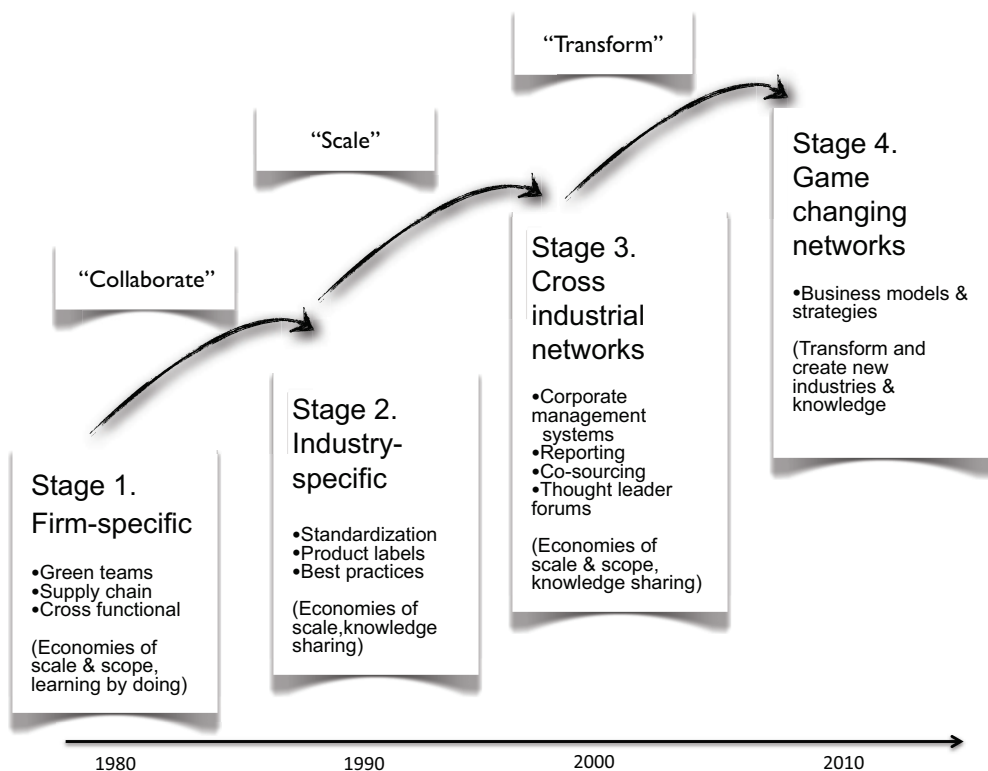


Figure 1.
The waves of green innovation

In order to achieve better results the leading companies started to expand the eco-efficiency criteria for their major suppliers. This led to industry-specific green innovation. The inter-company teams expanded collaboration with suppliers, NGOs and other key stakeholders within a firm's value-chain system. The pioneers shared & scaled green business practices within specific industries and organized coalitions around the compliance requirements of legislative changes and drove practices for standardized sustainability reporting. This involved sustainability driven material and component standardization and product labeling practices illustrated by e.g. the LEED standard in the construction industry and Energy Star in electronics. Companies increasingly joined networks structured around ecological ideologies (e.g. Natural Step).

These industry-wide developments were driven by seeking for ecological cost reductions, targeting the increasing green consumer segment, and trying to pre-empt stronger environmental legislation. 3M, for example, reduced its total pollution over 530.000 tons between 1975 and 1990 through its Pollution Prevention Pays program- leading to the savings of over \$500 million through lower material, compliance, disposal and liability costsⁱⁱⁱ. Achieving this kind of impact required making one's value chain sustainable.

The third wave of green innovations expanded collaboration to cross-industrial forums and coalitions seeking again economies of scale and scope in e.g. reporting (e.g. Global Reporting Initiative), green design and green business practices. Nike, Harley-Davidson and Patagonia partnered to enable viable new market conditions for environmentally friendlier leather sourcing.

The emergence of disruptive technologies such as gene-technology, renewable energy, nanotechnology and breakthroughs in information technology provided new opportunities for firms to design sustainable products and services. Companies started to reposition themselves in traditional industries relying heavily on polluting materials and technologies. Toyota's pioneering work on hybrid cars leading to the commercialization of Prius in 1997 paved way for the continuing transformation of the auto industry.

The fourth wave of green innovation aims to transform industries via radical new business models and platforms. Rather than striving to reduce the negative environmental impact of their operations like the greenhouse gas (GHG) emissions and carbon footprint, the pioneering companies seek innovative solutions that address the sustainability more directly. One example

is the “cradle to cradle” manufacturing principle suggesting a redesign of components and materials for continuous reuse^{iv}. These new innovation forms are still very much in the making. Several socially and environmentally oriented forums try to act as their catalysts, a number of prominent examples below:

- *Networks driven by thought leaders*: Former President Bill Clinton championed the Clinton Global Initiative. The network connects industry leader-global firms with non-profit organizations, celebrities and Nobel prize winners (e.g. Al Gore & Martti Ahtisaari). The forum provides a platform for solving global environmental, social and economical challenges.
- *Networks driven by “angels” and clean technology companies*: The GreenTech Innovation Forum was founded by John Doerr, Kleiner Perkins’ venture capitalist. He established an invitation only-network consisting of angel investors, start up firms and thought leaders in the Silicon Valley. The purpose is catalyze new radical business models for the clean tech industry.
- *Networks driven by the idea of smart systems*: Loose coalitions of firms collaborating in creating smarter complex service systems. The prime example is the smart grid movement enabling the optimization energy consumption through digitalized sensors, applications and monitoring. The goal is to design cross-industry, local & global platforms to manage the energy needs of companies, cities, buildings, vehicles and households. IBM (Smarter Planet Program) and GE (EcoImagination) are the key movers driving a complex web of initiatives involving technology and system vendors such as Cisco & Microsoft, and utilities like Duke Energy.
- *Networks driven by “naked transparency”*: examples include fully transparent platforms for green movement (Freecycle.org), conscious consumption (GoodGuide.com) and Whipcar's innovative peer to peer-car rental inspired business model.

The brief sketch of the evolution of sustainable innovation contains a number of managerially relevant points. The basic observation is the *constant increase and importance of green innovations*. Starting with vanguard individuals, conservation societies, and pioneering firms the idea of sustainable business, agriculture and social practices has become the dominant agenda of today. No firm can disregard the green dimension in its current and future business. Another

evident pattern is the *increasing relevance of collaboration in creation and commercialization of green innovations*. From individual company perspective the sustainable business practices have taken over entire value-chains requiring the learning of new orchestration skills and system. The recent developments in co-creating and managing complex technological & social systems go even beyond this calling for a leap from value-chains to value-networks and eco-systems thinking. Finally, one should note that although the waves of sustainable innovation highlight the increasing role of innovation networks and collaborative coalitions *all forms of green innovation are still valid*. The accumulation of knowledge and the variety of players have meshed into a complex multi-layered landscape of green business competition. This is a highly opaque world with competing technological coalitions, experimental and fluid business models and new breeds of firms and alliances. Sense making competence is essential for strategic navigation.

TOWARDS GAME CHANGING GREEN NETWORKS

“Are you in a regular type of relationship with somebody or are you truly making a difference that no single firm can make alone?” Graham Cross, Unilever^{vi}

What do we mean with the game changing innovation networks? These are new forms of competition that:

- Create new markets via radical reconfiguration of existing business models and/or enable the creation of new business fields.
- Challenge and shake the established industry structures and taking-for-granted recipes.

These networks often share several enabling characteristics:

- They combine uniquely network partners’ resources, capabilities, brands and intellectual frameworks.
- A jointly negotiated governance structure and orchestration model.
- Strong inter-organizational learning culture and skills.
- New business models that uniquely balance the economical drivers with the social, environmental, ethical and cultural aspects.

When succeeding these innovation networks create extraordinary value to customers, shareholders, employees, and to the global society. The game-changers understand deeply the emerging business opportunities through applying a systems perspective instead fixing only some parts of the value system. A successful orchestrator firm is highly dependent on the complementary skills and resources of its partner network.

Cases	Purpose	Orchestrators
Interface, Mission Impossible, founded in 1994	Redefine and transform the carpet industry business via environmental & ecological lenses.	CEO Ray Anderson + Eco Dream Team
Architecture for Humanity, 1999	Build communities of hope in countries with crisis via utilizing transparent, open sourced design	Cameron Sinclair + global network of 40 000 architects & designers
Masdar city, 2006	Create a global hub for clean energy research & development. Build cleanest city in the world.	Abu Dhabi Future Energy Company, Foster+ Partners and handpicked partners

Table 1.
Three Innovation networks and their orchestrators

Table 1 illustrates three potential game changing cases which range from a single firm driven networks to multi-party orchestration. The cases are presented in the following.

Mission Impossible in the Carpet Industry – Interface and its Eco-Dream Team approach

In mid 1990's, the carpeting business received increasing attention amongst the environmentalist organizations. Carpet manufacturing process was a high-toxic, petroleum-based process, releasing amounts of air- and water pollution and creating tons of waste. Industry leader's – the Interface Inc - manufacturing plants alone sent six tons of carpet trimmings to the landfill each day of the year. In 1994, the CEO of Interface (www.interface.com), Ray Anderson received a handwritten note stating: "Some customers want to know what Interface is doing for the environment?" At the time, Ray knew that the firm had no environmental vision and setting up an environmental response committee might not be the enough to convince action demanding customers. Nevertheless, a cross functional task force team was established to address the new challenge.

Lacking guidance to paint an environmental vision, Ray in desperation sought for inspiration which came in the form of a book written by an entrepreneur named Paul Hawken. The powerful messages of the book inspired Ray to present a bold new vision statement at the first environmental task force meeting. The core aspirations included taking leadership position in sustainability and integrating sustainability in all dimensions: people, process, product, place and profits. Anderson ended the presentation by saying: "*We're going to push until all products are made from recycled or renewable materials, until all waste is biodegradable or recyclable. No GHG gases up on smokestacks, no dirty water out a pipe, no piles of carpet scraps to the dump. Nothing.*" Initially, most managers were stunned and skeptical. How could a firm with close to zero know how in sustainability even dream about reaching zero GHG emissions at any given time frame?

Initiation of the Eco-Dream team: CEO Ray Anderson reasoned that Interface needed significant new knowledge and competences in order to understand and redefine their business purpose via environmental lenses. External advice and support was required for creating a compelling sustainability vision and strategy and in identification of the critical change areas. Anderson foresaw that respected visionaries of the emerging eco-movement could not only provide technological advice but endow the new strategy with credibility, motivation and accountability.

The Eco-Dream Team would also serve in challenging the deep-grained industry dogmas held by Interface's managers and employees.

Building the Eco-Dream Team: The original team consisted of members with specialized expertise on such core sustainability areas as engineering, architecture and alternative energy. The team eventually grew into the "Harlem Globetrotters" of sustainability including e.g. Paul Hawken, Amory Lovins and John Picard. Interface's core members included Ray Anderson, Head of Research Mike Bertolucci and VP of Research Jim Hartzfeld who started facilitating the meetings^{vii}.

How did Anderson succeed in building his team? The Dream Team members were motivated to join by several factors:

- Believing in CEO Ray Anderson's authentic pledge to change the direction of the firm.
- Being involved in an unprecedented transformation of an industry's harmful business practices.
- Being able to learn and challenge their thinking through working with a team of respected colleagues.

Maybe most importantly, the team members realized that such large corporations like Interface were needed to take the leadership role in driving the environmental revolution. The environmental movement would gain more from moving away from a "blame game" to active collaboration with the large firms in "dirty industries".

Setting the change agenda

The Dream Team facilitated the first game setting workshop to top 1000 employees of Interface in April of 1997. Ray Anderson presented the new visionary agenda and the Dream Team members joined in to establish "the roots of sustainability" for Interface's key employees. The team then demonstrated how individual managers & management teams and the whole organization can, by changing first their cognitive mind maps and then their actions catapult the Interface into a green future. After the kick-off seminar the change process was organized through issue and theme specific task groups. Each group was able utilize the expertise of the Dream Team members in topic specific workshops in addition to annual milestone seminars which have continued since the 1997 kick-off.

Key results

“ If a company like mine can get there, any company can.” Ray Anderson^{viii}

In April 2011, we asked Interface's Jim Hartzfeld what key results Interface had received by working with the Dream Team^{ix}. The first point was gaining deep yet holistic understanding of the new sustainability paradigm. The team experts pointed out and illustrated how the various elements of the sustainability interact. It was like seeing and understanding how the pieces of a complex puzzle started to fit together. Another really significant initiative was to connect these technological and functional aspects with the leadership and values, and consequently with the entire culture of the corporation. The new eco-challenge forced the top management to reassess the ultimate purpose of our business and ask: What are we doing, who are we becoming and where are we going?” Moreover, the Dream Team assisted in linking these elements with the social and human aspects.

The Dream team members’ work inspired the Interface's employees to innovate entirely new categories of green carpet innovations such as the Entropy- carpet range and the TacTile carpet tile installation system. These were inspired by the biomimicry principles created by Janine Benays, mimicking the ideas from nature. Entropy carpet became Interfaces’s all time best seller and the innovation underlying TacTile enabled the elimination of the use of glue in carpet installation^x.

By 2010, Interface was the global market leader with over \$1 billion in sales. Since 1996, Interface’s Mission Zero strategy has doubled earnings, cut 82% its greenhouse gas emissions, cut fossil fuel consumption by 60% and water use by 75%. The waste eliminating measures have saved a cumulative \$405 million of avoided costs and fueled the wave of next generation investments.

Interface’ s road to reduced emission company has proven profitable and an updated zero emission target has been set to 2020. While the firm’s business grows volume-wise, can they simultaneously lower the total GHG emission levels? And is there anymore need for the Eco Dream Team after Interface reaches the magical zero?^{xi} After 2020, will Interface enter the next game of green innovation, i.e. transforming into world's first restorative enterprise, emitting negative GHG emissions? These are some of the radical questions CEO Ray Anderson is using to encourage his corporation for continuous green innovation.

Architecture for Humanity- Changing the world one building and one design at a time

“Someone called us al-Qaeda for good because we have sleeper cells of designers and when a disaster happens, they wake up and move into action.” Cameron Sinclair^{xii}

Cameron Sinclair leads the Architecture for Humanity (AFH^{xiii}) a non-profit organization in San Francisco. He orchestrates a global network of designers and architects who co-design and build community centers into the worst neighborhoods on earth. The centers connect and are enabled by local entrepreneurs, financiers, global brands, educators and designers. AFH was founded in 1999 with \$700, a laptop and a web site by two part time cofounders, Cameron Sinclair and Kate Stohr. They initiated a global design competition to create new ideas for transitional housing for Kosovo's returning refugees. After receiving over 700 proposals from 53 different countries they eventually began to act as matchmakers between small scale community housing projects in distress locations and aid financiers. The ideas originated from the growing grass roots of designers with socially responsible design ambitions. The goal was to promote architectural and design solutions to global, social and humanitarian crises and enable the creation of sustainable and innovative local communities that contribute to human, social and ecological progress.

Evolution of the global network

In 2006, Cameron realized that the operating model needed to be scaled from one laptop and one man to an open source design, with guaranteed access for anyone, anywhere in the world. After winning the TED- prize in 2006^{xiv}, Cameron worked with Sun Microsystems and Creative Commons to create the Open Architecture network, the first open source system for facilitating design projects for sustainable design and architecture. In 2007 the organization hosted first design competitions on the new system. By 2011, AFH network contains over 40 000 designers and professionals who use open source as a free innovation tool. The network is organized through 73 chapters in 25 countries.

Operation principles and model^{xv}

- Evolvment from small scale to global “sleeper cell“- network. The initial visibility, achieved through winning the Kosovo housing project and subsequent work on providing fast transient and permanent housing in various crises situation, created high credibility and strong attraction in the design community. Through the open web design platform the very small core of a few dedicated persons were able to evolve into a global chapter network.
- *Ability to attract unique combination of global and local expertise.* Local chapters consist of - besides architects and designers - engineers, planners, scientists, NGOs, community leaders and local & global financiers. This unique combination of experience, competences and influence is invaluable in assessing the requirements for each project as well as get the key local people committed in them.
- *Choosing and working with the best talent.* After several humanitarian and design prizes and recognitions the AFH is a strong ‘magnet’ for socially oriented top architectures, designers and planners. For the construction jobs AFH can choose the best talent as they receive 100 applications for 1 job.
- *Changing the world one building and one local design at a time.* The AFH and its local chapters focus range from enabling housing to social and cultural change through supporting and creating local educational and facilitating microbusiness activities.
- *Designed locally, orchestrated in California;* the global design projects are orchestrated through the California headquarters but run locally. This ensures access and coordination with the global and regional actors and simultaneous coordination and flexibility at the local level.
- *Creating a lasting social, cultural and ethical footprint.* Architects and designers live in the villages to gain a deeper understanding of the local needs. All projects utilize locally sourced sustainable materials and man-power. The network members arrive to the crisis spot before the media arrives and stay still after the media’s focus evaporates.

Results and challenges

The AFH network has affected the lives of over 700 000 people through the design projects in 26 countries. After the disastrous earthquake and tsunami in Japan the AFH cells catalyzed into action after 90 minutes. When 75% of schools were destroyed in Haiti's 2010 earthquake, the network built 5 schools. For the World Cup 2010 tournament in South Africa, the network partnered with FIFA to build Football for Hope-centers which allowed girls to play soccer for first time in their lives. Cameron Sinclair's global network also provides funding to local entrepreneurs. In Bangladesh, a local tea shop owner wanted to create a mobile tea stall. The network provided a \$250 investment which funded the purchase of a bicycle with a small roof and an embedded solar panel. The panel's electricity provided a creative new revenue source; while a customer drinks tea he is able to charge the mobile phone against a minimal fee.

Although the AFH has been truly successful they face a scaling challenge as they have to reject about 90% of the projects suggested to them^{xvi}. The global economic downturn is also affecting fundraising. Some of the key questions include: should the network expand from 26 countries to, say 70 countries? Can it be done with the existing non-profit status, operating and orchestrating structure?

Masdar City/Abu Dhabi – via the ‘greenest city’ to clean tech leadership?

Masdar city concept was initiated by the Abu Dhabi government in 2006. The idea was to create a truly green city with the first zero carbon footprint in the world. The proposal, backed up by the Abu Dhabi government’s investment promise of \$15 billion in seed capital, aroused huge interest as the United Arab Emirates is one of the world’s worst polluting nations, measured by the CO₂ emissions per capita. The idea is to use the Masdar city project as a springboard for clean tech development. It is an important part of Abu Dhabi’s ambitious two-decade program to transform its economy from one based on natural resources to one based on knowledge, innovation and the export of cutting-edge technologies. Through Masdar project, Abu Dhabi’s Economic Vision 2030 aspires to be an international hub for renewable energy and sustainable technologies, increase the non-oil share of the economy from approximately 40% to more than 60% and significantly diversifying the scope of economic activity. If successful the Masdar city has the potential to transform the Emirates economy over the next two decades^{xvii}.

Agenda realization

How to realize this kind of ambitious vision in difficult environmental and socioeconomic context? The Abudabi governments employed a basically four pronged but intertwined approach involving the design of the Masdar city itself, mobilizing global partners’s “brains (e.g. MIT) and wallets (e.g. Credit Suisse) for developing the next generation greentech projects.

Foster+Partners, the British architectural company provided the master designs for the city planned to be the home for 50,000 people and 1,500 businesses, primarily commercial/manufacturing facilities specializing in environmentally friendly products. Starting from a clean slate the latest green energy and design principles could be applied. All buildings are to be energy-efficient and powered by clean technologies. A solar-powered desalination plant will provide the city’s water needs and 80% of the water used would be recycled. The city is designed as a walled community to keep out the hot desert winds. The roofs and canopies are dedicated to solar panels. Further, the plan covers e.g. wind turbines, waste-to-energy facilities and slack in the plan to adopt emerging renewable technologies^{xviii}.

In order to attract companies for building the next generation clean technology cluster a living laboratory for new energy technology was to be located in Masdar city. Besides

handpicked corporate partners, Masdar initiated partnership with the MIT to establish the Masdar Institute of Science and Technology (MIST).

Results and challenges

Although the Masdar City project has suffered from the economic recession it has already achieved considerable results. The first phase of the city has been built and opened. By spring 2011 the MIST has attracted 170 students from 32 countries, the business consortium has over 70 global companies and Masdar has contracted to build Shams1, one of the world's largest concentrated solar power plants and the first-of-its-kind in the Middle East. Besides the clean tech emphasis the business development and research concerns several intertwined fields: e.g. environmental resources and sustainable agriculture technologies, energy - & material efficiency and building/power-grid efficiency.

Several challenges remain. The construction deadline was postponed from 2015 to 2025. The clean tech energy solutions have proved to be difficult partly because of difficult environmental conditions (sandstorms and dust) and partly because investments have been postponed for exploring alternative technologies. The project has also attracted its share of criticism as skeptics point out that the Masdar city will be only symbolic for Abu Dhabi forming a luxury gated community development project for the wealthy. On the other hand, it has endorsed by such major actors as the US Department of Energy, the global conservation charity World Wide Fund for Nature and the sustainability group BioRegional.

Playing the Green Innovation Games

Four Games of Green Innovation

The sketched cases address very different green innovations. Yet they contain important similarities, which provide guidance for how to play the green innovation game. The analyzed cases highlight a number of aspects which are critical value-drivers: enhancing the effectiveness of current business model, collaboration as essential means for gaining resources and complimentary competencies, sense making and experimenting for new technological and business model innovation and scaling these innovations into competitive market offerings. Using these insights we propose a space for green game-changers depicted in Figure 2.

The vertical axis reflects that game-changers need to navigate between experimenting with new green solutions and scaling these into competitive market offerings. The horizontal axis indicates the efficiency targets of firms while and their need to invent breakthrough innovations via sense making of emerging technological pathways and socio-economic opportunities.

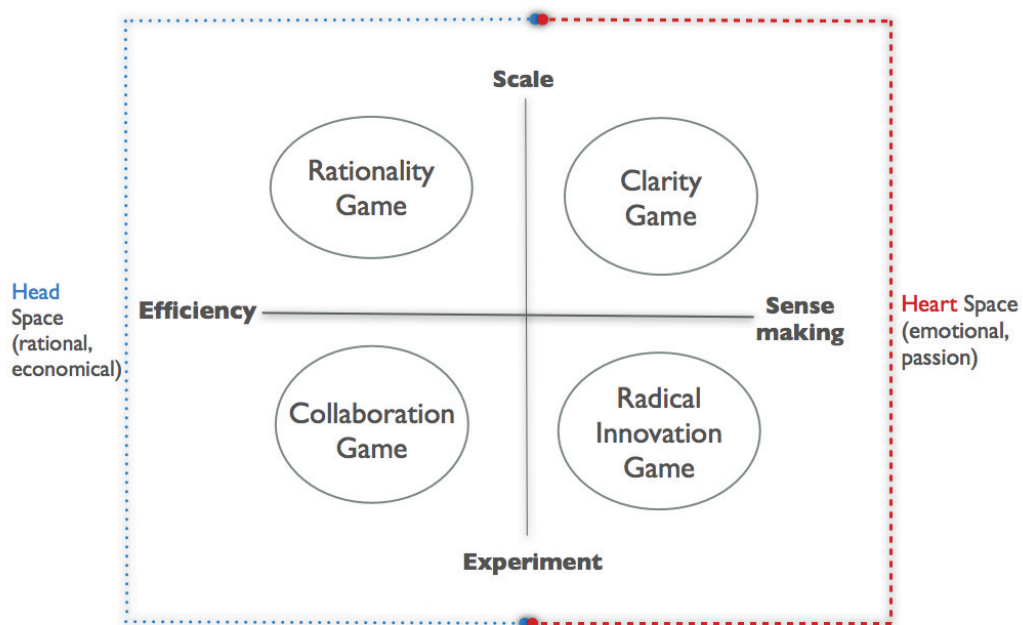


Figure 2.
The four games of green innovation

Juxtaposing these dimensions produces a matrix with four distinctive games that drive the playground for value creation of green innovations. The Rationality Game on the upper-left corner focuses on improving the green efficiency of the current business systems through incremental innovation. This is the game which the Interface excels. The lower-left corner concentrates also on efficiency but extends the play to collaboration partners; customers, suppliers and various experts. Through Collaboration Game players access critical resources and competences and drive the greening of whole value-chains. This was an essential part in each case. It is a must for such small actors as the AFH but also critical for big players as the Interface.

Shifting to the lower-right quadrant of the model, the game-changers experiment in creation of new radical innovations by placing bets on emerging technologies and the

opportunities they offer. Mobilizing a partner network to share the financing and risk and to provide complementary knowledge and competences is a wise way of playing the Radical Innovation Game as illustrated by the government of Emirates in Masdar city. Sense making is an essential capability in thriving in the complex environment of emerging technologies, markets and ecosystems. Advanced sense making enables the player to develop a foresight of the evolving green solutions and business opportunities. Through foresight a player can construct a visionary change agenda and attract same minded partners to create game-changing innovations. Interface succeeded early in this Clarity Game and was able to establish a strong driving position in the carpeting industry. Apple has done the same in mobile devices and applications. It remains to be seen if the Masdar can achieve the same in cleantech.

The Head Space and the Heart Space

The green innovation matrix provides a significant navigation aid for managers. However, there are a number of complexities to recognize. Innovators wanting to drive their fields must generally master several games. Performing well in one or two quadrants alone does not guarantee long-term sustainable competitive advantage and might result even in failure. Firms like Interface, IBM, GE and Nike have illustrated that industry leader can simultaneously play multiple green innovation games successfully. This is *challenging as the games differ widely in terms of the relevant managerial capabilities*. The key distinctions follow the main dimensions of the space which influence the required managerial mindset and decision making.

The left hand side describes innovations taking place in current industries and business ecosystems. It is generally dominated by rational economic analysis. We call this the *Head Space* (blue color). Managers are framing investment into green innovation via economical and rational lenses. Data and figures are driving the justification of investments into green innovations with established financial routines and mental recipes such as ROI. The Head space thinking optimizes, seeks efficiencies and attempts to scale the incremental green innovations with the help of partners within the established value chain. Thus, the Head space dominates the games of Rationality and Collaboration.

The right hand side is characterized by emerging technologies and ecosystems. There are no clear markets and competing technologies involve great uncertainty and risk. This kind of emerging non-transparent environment requires, besides strong sense making skills, a courage to

take leaps of faith. We call this the *Heart Space* (red color) where decision making is influenced by strong motivation to create great new solutions for saving the planet and society. The Heart mindset involves emotional, social and environmental perspective and such intangible values as passion, courage, and engagement. This mindset challenges the collective mind by asking uncommon or heretical out of the box questions^{xix}. IBM's study of CEOs identified creativity as the most important leadership quality^{xx}. The Heart Space values leaders with endurance, inspiration and “guts” to survive multiple failures. It dominates the games of Radical Innovation and Clarity, where the experimenting and investments involve great uncertainty.

As in sports or politics, in business, no games will be won without the unique *combination* of the Head & Heart space. Currently, many management boards frame the green issue from one dimensional lenses, decision making driven by closed rational reasoning. But is the rational justification enough to inspire leaders and partners to go beyond what is easily achievable? The relevance of emotionally-based capabilities has recently been recognized also the basically rational capabilities-based view of the management^{xxi}. Any firm with enough capital can hire the same consultants to gain quick wins and copycat green innovations in. Yet, the shakers of tomorrow need to move beyond business as usual-framing. This is the telling point in all our game-changer cases. Who dares, wins?

How to play the Games?

As pointed out aspiring green game-changers should be able to play well several games as the games are highly interrelated. Only firms with a narrow focus can excel by specializing in various innovator and partnership roles. Whether you are operating in a Head or Heart Space in the matrix you need to manage four phases in the innovation: *agenda setting, competence and resource mobilization, innovating, and scaling & diffusion*.

Rationality and Collaboration Games – How to Renew your Firm and Industry

The essence in these games is to improve the green efficiency of the firm and the entire value chain under the current business paradigm. Two major ways can be distinguished. One is a constant rationality game with small incremental enhancement of one's manufacturing and business processes. With the increasing price rises and volatility of commodities and natural resources this is a must for all manufacturing companies. For example, IBM and Walmart are

systematically greening their business processes. Their game is based on careful analysis and project-based goal setting on efficiency targets. These are then carried out within the corporation and practically enforced upon key supplier partners and other channel members.

A more ambitious game plan is well illustrated by the Interface case. Driven by a strong vision of the need for more fundamental sustainability of the “dirty” carpet business CEO Anderson was able to mobilize an Eco-Dream Team and create a long-term change. Through visionary industry reframing and agenda communication the corporation and its key suppliers and partners were able to create and scale radical process and product innovation in a very traditional industry.

Through continuous experimenting Interface created several green blockbuster products for the carpeting industry, including industry's first carbon neutral carpet, forcing its competitors to follow suit. To push recycling and takeback programs to new levels, Interface declared that it could even recycle its competitors used carpets and use them as “upcycled” raw material for its new carpet models. This remarkable change and industry leadership was achieved by Interface's ability to excel not only in the Rationality and Collaboration Games but also in the Radical Innovation and Clarity Games. With the initiative of Ray Anderson the corporation created a successful balance of the Head and Heart cultures and was able to attract the best minds for realizing the visionary green agenda.

Radical Innovation and Clarity Games – How to change the world

These games are the playground for entrepreneurs, venture capitalists, innovative companies and government bodies trying to create radical innovations for opening up new business and social ecosystems and saving the planet. They face a highly complex socio-economic and political landscape constantly transformed by emerging and often competing technological paradigms. It is wrought with high uncertainty about potential dominating energy sources, materials and processes. Players who want to drive their potential innovations have to be able to construct credible agendas for attracting investors and partners with complementary competences and resources.

AFH case shows how only a couple of strong willed individuals can make a real difference when they are able – through winning initial credibility – to mobilize international financing and local expertise for creating a global project network for sustainable emergency

housing and small business innovation. The entrepreneurs have mastered the Games of Clarity, Innovation and Collaboration but phase difficulties in crossing the chasm of more extensive scaling of the network.

The Masdar-initiative is bold attempt to master all the games by bringing together a network of actors having jointly the resources and competencies for creating an ecosystem for green energy research, innovation, and deployment. Through strong initial funding and agenda setting the Abu Dhabi Government has been able to mobilize an international group of financiers, sustainable energy and construction experts and world class research and education experts.

These examples show how radical game-changers have to reach outside their own corporate or even national borders to gain deeper understanding of the emerging green paradigm. Game-changers mobilize and drive a collective network towards making sense of how the economical and technological pieces fit and interact with the environmental, social and human issues. They possess the skills to connect culture, values and leadership to the ultimate purpose of the network. Through their passion and daring agendas they appeal to top talent and jointly co-create a greener future for us.

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